BROCKVILLE DRINKING WATER SYSTEM

BROCKVILLE
CITY OF THE 1000 ISLANDS

2021 ANNUAL WATER QUALITY REPORT

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DATE: February 4, 2022

EXECUTIVE SUMMARY

The City of Brockville's Water Systems Division is pleased to provide the 2021 Annual Drinking Water Quality Report. The purpose of this report is to keep the public and Council informed regarding the quality of the City's drinking water and the performance and maintenance of our water treatment and distribution systems.

The City of Brockville is dedicated to delivering a clean, safe, reliable, drinking water supply to the consumer while remaining compliant with all regulatory requirements. Achievement of those commitments is supported by risk-based process evaluation, staff competency, effective communications, and appropriate contingency / incident response measures. The managers and employees of the City of Brockville who are directly involved in the production and delivery of safe drinking water are committed to and share in the responsibilities for implementing, maintaining, and contributing to the continual improvement of the Drinking Water Quality Management System. The water delivered to the consumers in the City of Brockville and a portion in the Township of Elizabethtown-Kitley continues to be safe, meeting all drinking water quality regulatory standards.

This Annual Drinking Water Quality Report is prepared in accordance with the Municipal Drinking Water Licence, Drinking Water Works Permit for the Brockville Drinking Water System and Ontario Regulation 170/03, Section 11 and Schedule 22. Included with this report are analytical data, plant flow, adverse water quality incidents and corrective action resolutions, as well as a process flow schematic of the facility.

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LIST OF ACRONYMS & DEFINITIONS

AWQI	Adverse Water Quality Incidents Examples of adverse water results: ▪ An analytical result that exceeds a health-based water quality standards ▪ Any evidence that disinfection may not have been effective ▪ Low chlorine residuals
C of A	Certificate of Approval
CFU	colony forming units
CGSB	Canadian General Standards Board
DWQMS	Drinking Water Quality Management Standard
GUDI	groundwater under the direct influence of surface water
L/s	litres per second
m^3/d	cubic metres per day
mg/L	milligrams per litre
mL	milliliter
ML/d	Mega (million) litres per day
MECP	Ministry of the Environment, Conservation and Parks (Ontario)
MOH	Medical Officer of Health
PVC	Poly Vinyl Chloride
O. Reg.	Ontario Regulation
PTTW	Permit to Take Water
R.R.O.	Revised Regulations Ontario (1990)
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act, 2002
WTP	Water Treatment Plant

1. INTRODUCTION

This Annual Water Quality Report is for the period from January 1st to December 31st, 2021 and includes reporting for both the municipal drinking water treatment and distribution systems that the City of Brockville owns and operates and the water distribution system that the Township of Elizabethtown-Kitley owns and the City of Brockville operates.

This report contains three different reports required for the City of Brockville and the Elizabethtown-Kitley Drinking Water Systems:

- Section 11 Annual Report, as per Section 11 of O. Reg. 170/03
- Summary report as per Schedule 22 of O. Reg. 170/03
- Summary of the raw water values that were submitted to the Ministry of the Environment, Conservation and Parks under O. Reg. 387/04 Water Taking & Transfer

This annual report is available to the public at no charge. Users of this drinking water system have been notified that this annual report is available by placing a notice on the City of Brockville's website and water billing inserts. The 2021 Annual Water Quality Report is available at the following locations:

- City of Brockville's website - www.brockville.com
- City of Brockville – Public Library
- City of Brockville – Customer Service office, City Hall
- City of Brockville – Water Systems Division, 20 Rivers Ave., 613-342-8772 ext. 5512
- Township of Elizabethtown-Kitley's website - http://www.ektwp.ca
- Township of Elizabethtown-Kitley's Municipal Office – 6544 New Dublin Road, RR#2 Addison

* Due to COVID-19 restrictions some locations may not be open to the public

2. LEGISLATED REQUIREMENTS

2.1 Drinking-Water Systems Regulation (O. Reg. 170/03)

Under Schedule 22 of the Drinking Water Systems Regulation (O. Reg. 170/03), Summary Reports for Municipalities, annual reports to the owners of large municipal residential systems and small municipal systems are required. The summary report must be submitted no later than March 31st to members of municipal council. The contents must list the requirements of the *Safe Drinking Water Act, 2002*, the regulations, the system's approval and any order that the system failed to meet at any time during the reporting period covered, specify the duration of the failure, and the measures taken to correct the failure.

In addition, the report must include a summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly averages, maximum daily flows and daily instantaneous peak flows. The summary must be compared to the rated capacity and flows provided in the system's Municipal Drinking Water Licence.

The City of Brockville is the Owner of the Water Treatment Plant, trunk and local water distribution systems, and the City of Brockville is the Operating Authority for the Township of Elizabethtown-Kitley's water distribution system.

2.2 Summary of Regulatory Requirements

Acts and Regulations

Regulated systems must meet the requirements of Ontario's *Safe Drinking Water Act, 2002* and its regulations. Most notably, the Drinking Water Systems Regulation sets out treatment and testing requirements for all categories of regulated water systems, including small non-municipal and seasonal operations.

Safe Drinking Water Act, 2002

In the Part Two Report of the Walkerton Inquiry, Justice O'Connor recommended that the Ontario government enact a *Safe Drinking Water Act, 2002* to deal with matters related to treatment and distribution of drinking water. As articulated by Justice O'Connor, the purpose of the *Safe Drinking Water Act, 2002* is to gather in one place all legislation and regulations relating to the treatment and distribution of drinking water.

Summary of Provincial Legislation Significant to Water Operations

ACT	O. Reg.
WATER OPPORTUNITIES and WATER CONSERVATION ACT	
➢ Water Opportunities and Water Conservation Act, 2010	**Bill 72**
CLEAN WATER ACT, 2006	
➢ Source Protection Areas and Regions	O. Reg. 284/10
➢ Source Protection Committees	O. Reg. 288/10
➢ Terms of Reference	O. Reg. 287/07
SAFE DRINKING WATER ACT, 2002	
➢ Drinking Water Systems Regulation	O. Reg. 170/03
➢ Certification of Drinking-Water System Operators and Water Quality Analysts	O. Reg. 128/04
➢ Drinking Water Testing Services - relating to laboratory licensing	O. Reg. 248/03
➢ Schools, private schools and day nurseries	O. Reg. 243/07
➢ Compliance and Enforcement Regulation	O. Reg. 242/05

SAFE DRINKING WATER ACT, 2002 Continued	
➢ Ontario Drinking Water Quality Standards	O. Reg. 169/03
➢ Definitions of Words and Expressions Used in the Act	O. Reg. 171/03
➢ Definition of Deficiency and Municipal Drinking Water System	O. Reg. 172/03
➢ Licensing of Municipal Drinking-Water Systems	O. Reg. 188/07
➢ Financial Plans	O. Reg. 453/07
ONTARIO WATER RESOURCES ACT	
➢ Licensing of Sewage Works Operators	O. Reg. 129/04
➢ Approval Exemption	O. Reg. 525/98
➢ Wells	R.R.O. 1990, Reg. 903
➢ Revoking Ontario Regulation 459/00	O. Reg. 175/03
➢ Revoking Ontario Regulation 505/01	O. Reg. 176/03
➢ Water Taking	O. Reg. 387/04
➢ Charges for Industrial and Commercial Water Users	O. Reg. 450/07
ENVIRONMENTAL PROTECTION ACT	
➢ Certificate of Approval Exemptions - Air	O. Reg. 524/98
ENIVIRONMENTAL BILL OF RIGHTS ACT	
➢ Prescribing the Safe Drinking Water Act, 2002	O. Reg. 257/03

3. ANNUAL WATER QUALITY SUMMARY FOR 2021

The City of Brockville's Water Systems Division is responsible for the Brockville Drinking Water System under O. Reg. 170/03 including water treatment plant, trunk water distribution system (elevated storage, reservoirs, booster stations) and local water distribution systems. Staff's primary responsibility is water treatment and distribution in compliance with all applicable legislation and municipal drinking water licenses and drinking water works permits. Routine water quality testing and continuous monitoring of water quality and quantity is conducted to ensure compliance. All data from SCADA, process control point data, in-house laboratory results and external laboratory results are all captured in a WaterTrax data management system.

3.1 Water Quality Data

Raw and treated water is sampled and tested for chemical, physical and microbiological parameters in accordance with the requirements of O. Reg. 170/03 and individual municipal licenses and permits. Sampling is also conducted in the distribution system primarily for bacteriological indicators and evidence of sustained chlorine residuals. Enhanced sampling programs are also defined by the Water Systems Division, and testing procedures followed and where necessary submitted to external accredited laboratory for analysis. This level of water quality monitoring ensures public health and public confidence in the water supply.

The majority of analysis is conducted by an external accredited laboratory, with some specialized analysis contracted to other accredited laboratories. In accordance with Schedule 16 of O. Reg. 170/03, all required notifications of adverse water quality incidents are provided to the Spills Action Centre and Medical Officer of Health.

Operational Testing:
The following table is a summary of the operational testing completed in 2021 (as per O. Reg. 170/03, Schedules 6 and 7).

Parameter	# of Grab Samples	Results		
		MIN	MAX	AVG
Turbidity – Raw (NTU)	Continuous monitoring	0.10	9.99	0.43
Turbidity – Filter 1 (NTU)	Continuous monitoring	0.03	0.23	0.05
Turbidity – Filter 2 (NTU)	Continuous monitoring	0.03	0.54	0.06
Turbidity – Treated (NTU)	Continuous monitoring	0.04	9.73	0.06
Chlorine – Pre Filter (mg/l)	Continuous monitoring	0.00	2.49	0.56
Chlorine – Reservoir (Main Plant) (mg/l)	Continuous monitoring	1.68	2.38	2.12
Chlorine – Plant Effluent (mg/l)	Continuous monitoring	0.72	2.37	2.10
Chlorine – Distribution System Parkedale Reservoir (mg/l)	Continuous monitoring	0.60	2.31	1.79
Chlorine – Elizabethtown-Kitley Distribution System (mg/l)	52	0.58	1.52	1.12
Fluoride – Plant Effluent (mg/l)	365	0.12	1.04	0.53
UV Dosage (mJ/cm^2)	Continuous monitoring	0	3277	68
UV Intensity (mW/cm^2)	Continuous monitoring	0	117	n/a
UV Transmittance (%)	365	95.0	99.2	96.2

Microbiological Testing:
Microbiological testing completed under the Schedule 10, 11 or 12 of O. Reg. 170/03 during 2021 reporting period.

Sample Description:	Number of Samples	Range of E. Coli Or Fecal Results CFU/100ml		Range of Total Coliform Results CFU/100ml		Number of HPC Samples	Range of HPC Results CFU/ml	
		MIN	MAX	MIN	MAX		MIN	MAX
Raw	52	0	20	0	600	52	<10	450
Treated	52	0	0	0	0	52	<10	20
Distribution	496	0	0	0	0	352	<10	280

Chemical Testing:
The following Tables are a summary of the chemical testing completed in 2021 (as per O. Reg. 170/03, Schedule 13).

Schedule 23
Summary of Inorganic parameters tested during this reporting period or the most recent sample results:

Parameter	Sample Date	Result Value	Unit of Measure	Exceeded the Standard	Exceeded Half the Standard
Antimony	2021-01-05	0.0001	mg/l	No	No
Arsenic	2021-01-05	0.0005	mg/l	No	No
Barium	2021-01-05	0.021	mg/l	No	No
Boron	2021-01-05	0.007	mg/l	No	No
Cadmium	2021-01-05	<0.000015	mg/l	No	No
Chromium	2021-01-05	<0.002	mg/l	No	No
Mercury	2021-01-05	<0.00002	mg/l	No	No
Selenium	2021-01-05	<0.001	mg/l	No	No
Sodium	Jan. – Dec. (12 samples)	14.4*	mg/l	No	n/a
Uranium	2021-01-05	0.00024	mg/l	No	No
Nitrite	Quarterly (4 samples)	<0.1*	mg/l	No	No
Nitrate	Quarterly (4 samples)	0.2*	mg/l	No	No

average
n/a – not applicable

Schedule 24
Summary of Organic parameters sampled during this reporting period or the most recent sample results:

Parameter	Sample Date	Result Value	Unit of Measure	Exceeded the Standard	Exceeded Half the Standard
Alachlor	2021-01-05	<0.3	ug/l	No	No
Atrazine + N-dealkylated metabolites	2021-01-05	<0.5	ug/l	No	No
Azinphos-methyl	2021-01-05	<1	ug/l	No	No
Benzene	2021-01-05	<0.5	ug/l	No	No
Benzo(a)pyrene	2021-01-05	<0.005	ug/l	No	No
Bromoxynil	2021-01-05	<0.5	ug/l	No	No
Carbaryl	2021-01-05	<3	ug/l	No	No
Carbofuran	2021-01-05	<1	ug/l	No	No
Carbon Tetrachloride	2021-01-05	<0.2	ug/l	No	No
Chlorpyrifos	2021-01-05	<0.5	ug/l	No	No
Diazinon	2021-01-05	<1	ug/l	No	No
Dicamba	2021-01-05	<1	ug/l	No	No
1,2-Dichlorobenzene	2021-01-05	<0.5	ug/l	No	No
1,4-Dichlorobenzene	2021-01-05	<0.5	ug/l	No	No
1,2-Dichloroethane	2021-01-05	<0.5	ug/l	No	No
1,1-Dichloroethylene	2021-01-05	<0.5	ug/l	No	No
Dichloromethane	2021-01-05	<5	ug/l	No	No
2-4 Dichlorophenol	2021-01-05	<0.2	ug/l	No	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	2021-01-05	<10	ug/l	No	No
Diclofop-methyl	2021-01-05	<0.9	ug/l	No	No
Dimethoate	2021-01-05	<1	ug/l	No	No
Diquat	2021-01-05	<5	ug/l	No	No
Diuron	2021-01-05	<5	ug/l	No	No
Glyphosate	2021-01-05	<25	ug/l	No	No
Malathion	2021-01-05	<5	ug/l	No	No
2-Methyl-4-Chlorophenoxyacetic acid (MCPA)	2021-01-05	<10	mg/l	No	No

Parameter	Sample Date	Result Value	Unit of Measure	Exceeded the Standard	Exceeded Half the Standard
Metolachlor	2021-01-05	<3	ug/l	No	No
Metribuzin	2021-01-05	<3	ug/l	No	No
Monochlorobenzene	2021-01-05	<0.5	ug/l	No	No
Paraquat	2021-01-05	<1	ug/l	No	No
Pentachlorophenol	2021-01-05	<0.2	ug/l	No	No
Phorate	2021-01-05	<0.3	ug/l	No	No
Picloram	2021-01-05	<15	ug/l	No	No
Polychlorinated Biphenyls(PCB)	2021-01-05	<0.05	ug/l	No	No
Prometryne	2021-01-05	<0.1	ug/l	No	No
Simazine	2021-01-05	<0.5	ug/l	No	No
THM (NOTE: shows latest annual average)	Quarterly *(min)* (4 samples)	38.3*	ug/l	No	No
HAA's (NOTE: shows latest annual average)	Quarterly *(min)* (4 samples)	18.8*	ug/l	No	No
Terbufos	2021-01-05	<0.5	ug/l	No	No
Tetrachloroethylene	2021-01-05	<0.5	ug/l	No	No
2,3,4,6-Tetrachlorophenol	2021-01-05	<0.2	ug/l	No	No
Triallate	2021-01-05	<10	ug/l	No	No
Trichloroethylene	2021-01-05	<0.5	ug/l	No	No
2,4,6-Trichlorophenol	2021-01-05	<0.2	ug/l	No	No
Trifluralin	2021-01-05	<0.5	ug/l	No	No
Vinyl Chloride	2021-01-05	<0.2	ug/l	No	No

average

LEAD SAMPLING:

Brockville Drinking Water System (Lead Sampling Exemption for plumbing only)

Sampling Period – Winter (December 15th to April 15th)	Plumbing	Distribution
Number of individual samples	N/A	4
Number of sample points (locations)	N/A	4
Number of individual sample exceedances	N/A	0
Number of sample points with an exceedance during the period	N/A	0
Percentage of sample points with an exceedance	N/A	0
Is the system required to have a Corrosion Control Plan prepared?	NO	NO
Do the reduced sampling & frequency requirements apply to the system?	NO	YES
Do the plumbing sample exemptions apply to the system?	YES	N/A

Sampling Period - Summer (June 15th to October 15th)	Plumbing	Distribution
Number of individual samples	N/A	4
Number of sample points (locations)	N/A	4
Number of individual sample exceedances	N/A	0
Number of sample points with an exceedance during the period	N/A	0
Percentage of sample points with an exceedance	N/A	0
Is the system required to have a Corrosion Control Plan prepared?	NO	NO
Do the reduced sampling & frequency requirements apply to the system?	N/A	YES
Do the plumbing sample exemptions apply to the system?	YES	N/A

Elizabethtown-Kitley Distribution System (Lead Sampling Exemption for plumbing only)

Sampling Period – Winter (December 15th to April 15th)	Plumbing	Distribution
Number of individual samples	(Lead Sampling Regulatory Relief)	2
Number of sample points (locations)	N/A	2
Number of individual sample exceedances	N/A	0
Number of sample points with an exceedance during the period	N/A	0
Percentage of sample points with an exceedance	N/A	0
Is the system required to have a Corrosion Control Plan prepared?	NO	NO
Do the reduced sampling & frequency requirements apply to the system?	N/A	YES
Do the plumbing sample exemptions apply to the system?	YES	N/A

Sampling Period - Summer (June 15th to October 15th)	Plumbing	Distribution
Number of individual samples	(Lead Sampling Regulatory Relief)	2
Number of sample points (locations)	N/A	2
Number of individual sample exceedances	N/A	0
Number of sample points with an exceedance during the period	N/A	0
Percentage of sample points with an exceedance	N/A	0
Is the system required to have a Corrosion Control Plan prepared?	NO	NO
Do the reduced sampling & frequency requirements apply to the system?	N/A	YES
Do the plumbing sample exemptions apply to the system?	YES	N/A

4. BROCKVILLE DRINKING WATER SYSTEM

4.1 Water System Description

Drinking-Water System Number:	220001263
Drinking-Water System Name:	Brockville Drinking Water System
Drinking-Water System Owner:	City of Brockville
Accredited Operating Authority:	City of Brockville
Municipal Drinking Water Licence:	152-101
Drinking Water Works Permit:	152-201
Permit To Take Water:	8577-5ZCP45
Drinking-Water System Category:	Large Municipal
Design Capacity:	36.4 ML/D
Treatment:	Direct Filtration Class III
Local Distribution:	Class II
Trunk Distribution:	Class III
Source Water:	St Lawrence River
Population Served:	22,000

Connected Drinking-Water Systems:

Drinking-Water System Number:	260007777
Drinking-Water System Name:	Elizabethtown-Kitley Distribution System
Drinking-Water System Owner:	Township of Elizabethtown-Kitley
Accredited Operating Authority:	City of Brockville
Municipal Drinking Water Licence:	257-101
Drinking Water Works Permit:	257-201
Drinking-Water System Category:	Large Municipal Class I
Water Source:	City of Brockville DWS
Population Served:	350

4.1.1 Water Treatment Plant

The City of Brockville's Water Treatment Plant is a Class III direct filtration facility located at 20 Rivers Avenue, located on the St. Lawrence River and serves the City of Brockville (population 22,000), and a portion of the Township of Elizabethtown-Kitley (population 350).

A 900 mm raw water intake pipe equipped with zebra mussel control lies on the bottom of the St. Lawrence River extending 300 meters offshore at a depth of 10.5 meters. The treatment process has a design maximum flow rate of 36.4 ML/d and is composed of a number of sub-units:

- low lift pumping station
- coagulation and flocculation using polyaluminum chloride (PAC)
- pre- and post-filter disinfection with chlorine gas
- two granular activated carbon filters
- fluoride addition
- treated water reservoir and high lift pumping station
- final treated water UV disinfection and additional chlorination

4.1.2 Treatment Chemicals Used

All chemicals used in the operation of the drinking water system meets all applicable standards set by both the American Water Works Association ("AWWA") and the American National Standards Institute ("ANSI") safety criteria standards NSF/60 and NSF/61

Chemical	Application	Supplier
Chlorine Gas	Pre Filter, Post Filter, Plant Effluent (Primary Disinfection)	Brenntag Canada
Poly Aluminum Chloride XL-6 (SternPAC) PAX XL-1900 (ACH)	Pre Filter (Coagulant)	Kemira Water Solutions
Hydrofluorosilicic acid (HFSA)	Plant Effluent (Fluoride)	Brenntag Canada

4.1.3 Water Distribution System – Trunk and Local Systems

The Water Distribution System is separated into a Class III Trunk Water Distribution System (Certificate #3811) and a Class II Local Water Distribution System (Certificate #2193).

The distribution is comprised of 3 distinct pressure zones and consists of underground pipes ranging in size from 100 mm to 600 mm in diameter, made of a variety of materials including cast iron, ductile iron, poly vinyl chloride (PVC), concrete, steel, high density polyethylene (HDPE), and asbestos cement. There are approximately 8,400 service connections, 940 fire hydrants and 2,800 valves. Several treated water storage facilities and booster stations are located throughout the system as indicated below.

- Trunk Feeder Main & Local Distribution Systems
  600 mm single trunk feeder main from the WTP to the Church Street/Perth Street area where flow splits between the Water Tower and the Local and Trunk distribution systems.

- Water Booster Stations
  There are three (3) booster pump stations (First Avenue., Sunset Boulevard., Parkedale Avenue.) within the distribution system. These booster stations utilize pumps to ensure consistent pressure throughout the system.

- Perth Street Elevated Storage Tank (Water Tower)
  The most visible feature of the distribution system is the 2,270 m^3 (500,000 IG) elevated storage tank located on Perth St in Zone 1. It is a single cell, steel, non-baffled treated water storage tank.

- Parkedale Avenue Reservoir Booster Station
  The Parkedale Avenue Reservoir Booster Station is a 7,600 m^3 capacity reservoir at-grade, single cell, concrete, non-baffled, treated water reservoir. The station services two geographical areas. Zone 1 is the area South of Highway 401, and Zone 2 is the area North of Highway 401.
  Zone 1 and Zone 2 booster stations are located on this site and assist in maintaining system pressures within the 2 zones.

- First Avenue Booster Station
  The First Avenue Booster Station located on First Avenue services Zone 3. Zone 3 is defined by the boundary of First Avenue to the West, King Street East to the South, Broadway Avenue to the North, and Oxford Avenue to the East.

- Sunset Boulevard Booster Station
  This booster station is located within a below grade pump chamber on Sunset Boulevard and provides consistent pressure locally to Sunset Boulevard and Hollywood Place

4.2 2021 Flow Summary

In 2021 the maximum or peak instantaneous raw water flow recorded was 31.666 ML/day (21,990 L/min) which occurred on July 5th, 2021 and was below the permitted maximum amount of 36.400 ML/day (25,278 L/min). The maximum volume of raw water taken on any single day was 13.370 ML which occurred on August 31st, 2021, and was also below the permitted maximum of 36.400 ML/d.

The annual average daily raw water volume to the WTP was 10.578 ML/day or 29.1% of its maximum approved treatment capacity of 36.4 ML/day.

Maximum Permitted Water Taking (PTTW) – WTP

Condition:	Maximum Permitted Water Taking
Maximum Amount of Water Taken per Minute	25,278 (L/min)
Maximum Amount of Water Taken per Day	36.4 (ML/d)

The Permit to Take Water specifies the maximum flow into individual treatment systems as indicated below.

Maximum Flow to Treatment System – WTP

Treatment System/Stage:	Maximum Flow Rate (ML/d)
GAC Filters – Flow	19.6 each
UV Disinfection System	36.4 each

The summary of the volume of water taken daily and the flows of the water supplied during the 2021 calendar year is provided in **Appendix C** and includes 2021 flow data and historical flow of past years of pumping at the WTP.

The historical total plant distributed volume is also displayed in **Appendix C**. The total annual plant distributed volume for 2021 is 0.73% less than the total annual plant distributed volume from 2020. This information is provided for interest and to evaluate the treatment system trends over time in order to prepare for any future improvements required to meet this demand.

4.3 Adverse Test Results

In accordance with Schedule 16 of O. Reg. 170/03, all required notifications of adverse water quality incidents were provided to the Medical Officer of Health (MOH) and the Spills Action Centre (SAC). In 2021 there was a total of one (1) report filed with SAC as summarized below.

AWQI Incident Date	Parameter	Result	Corrective Action	Corrective Action Date
April 18, 2021 AWQI 153895	Loss of continuous monitoring – Filter Turbidity	N/A	Notification to MOH & SAC Loss of trending for 26 minutes Repair to ethernet cable to restore communications Replacement of PLC processor and communications port	April 18, 2021

4.4 Operator Certification

The *Certification of Drinking-Water System Operators and Water Quality Analysts* (O. Reg. 128/04) requires owners to ensure that every operator employed in the facility holds a Licence applicable to that type of facility. All operators in the Water Systems Division hold the required certifications for treatment and distribution.

4.5 Capital Program

The 2021 Capital Program can be found in **Appendix B** of this Report. All works are subject to the annual budget process and approval by Council. A 30 Year Capital Replacement Equipment Plan has been developed that includes an extensive breakdown of all capital equipment that requires allocated funds for refurbishment or replacement. This is not included in the Annual Summary Report but can be made available upon request.

5. TOWNSHIP OF ELIZABETHTOWN-KITLEY WATER DISTRIBUTION SYSTEM

5.1 Water System Description

The City of Brockville provides treated water from its Water Treatment Plant to the Elizabethtown-Kitley Class I Water Distribution System (Certificate# 3536) west of the City. This is facilitated through a 14 kilometer water main that extends along County Road #2 to the Country Club, through a meter chamber and associated appurtenances. This distribution system services approximately 350 residential customers. This system was installed in 1998 by the Ministry of Transportation and the Ontario Clean Water Agency and turned over to the Township of Elizabethtown-Kitley in 1999.

A booster station at Lily Bay provides for increased pressure only. The Township Fire Department is aware of this operational constraint and does not use the distribution system for firefighting or training purposes. An automated flushing station at the end of the service line is required to maintain free chlorine residual above the regulated minimum level of 0.20 mg/L. City Staff operate and maintain this system on behalf of the Township as the Operating Authority.

Township of Elizabethtown-Kitley

Drinking-Water System Number:	260007777
Drinking-Water System Name:	Elizabethtown-Kitley Distribution System
Drinking-Water System Owner:	Township of Elizabethtown-Kitley
Accredited Operating Authority:	City of Brockville
Municipal Drinking Water Licence:	257-101
Drinking Water Works Permit:	257-201
Drinking-Water System Category:	Large Municipal Class 1
Water Source:	City of Brockville DWS
Population Served:	350

5.2 Adverse Test Results

No adverse water quality incidents reported to SAC in 2021 for the Township of Elizabethtown-Kitley Water Distribution System.

5.3 Historical Flow Results

A summary of the volume of water taken daily and the flows of the water supplied during the 2021 calendar year is provided in **Appendix C**.

The historical flow is also displayed in **Appendix C**. The total flow for 2021 is 8.9% more than the total flow from 2020. This information is provided for interest and to evaluate the system flow trends over time to prepare for any future improvements required to meet this demand.

6. CONCLUSION

The City of Brockville serves approximately 22,000 residents and about 350 residents in the Township of Elizabethtown-Kitley. One of the City's most important responsibilities is to protect public health by providing its residents with clean, safe drinking water. Routine water quality testing and continuous monitoring of the water quality and quantity is completed by City Staff at the Water Treatment Plant and throughout the distribution systems to demonstrate that the City consistently meets or exceeds the standards set by the MECP.

In Ontario, water taking, treatment and distribution are governed by several Acts and Regulations. This report fulfills the reporting requirements of the Drinking Water System Regulation (O. Reg. 170/03) made under the Safe Drinking Water Act for all of the municipal drinking water treatment systems in the City of Brockville and the Township of Elizabethtown-Kitley, and covers the period from January 1st to December 31st 2021. As required under this same regulation, the report is prepared prior to March 31st and is filed for review by both the City of Brockville's and Elizabethtown-Kitley's municipal council. Copies of the report are also on hand at the Public Library, the Customer Service Office at City Hall, the Water Treatment Plant at 20 Rivers Avenue, Brockville and the Township of Elizabethtown-Kitley's Municipal Office at 6544 New Dublin Road, RR#2 Addison.

The contents of this report highlight the requirements of the Safe Drinking Water Act, the regulations, and the systems' approval including any reportable events and the corresponding corrective actions undertaken in 2021. In addition, the report also includes a summary of the quantities and flow rates of the water supplied during the calendar year, including monthly averages, maximum daily flows, and daily instantaneous peak flow rates. The summaries are compared to the rated capacity and flow rates in the system approvals.

The Water Systems Division has taken all necessary steps to comply with all regulatory requirements in the production and distribution of safe drinking water and to conform to the requirements of implementing and maintaining a Drinking Water Quality Management System. The dedication and commitment of all Water Systems Staff ensures a safe reliable drinking water supply to consumers of the City of Brockville and a portion of the Township of Elizabethtown-Kitley.

7. KEY CONTACTS

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2021 PROPOSED CAPITAL PROGRAM

PROJECT NAME:	Water Equipment/Construction - Proposed Maintenance and New Capital			YEAR PROPOSED	2021
LOCATION:	Brockville Water Treatment Plant, Distribution System, Trunk Distribution System and Booster Stations				
SCOPE:	Provides for the capital needs of the Water Treatment Plant, Distribution System, Trunk Distribution System and Booster Stations. Funding is provided through water revenues.				
PROJECT ID:	**Priority**	**GL**		**Budget**	**Project Suffix**
			WATER SYSTEMS - PROPOSED CAPITAL PROJECTS		
	1		Diesel pump exhaust replacement at Parkedale (TSSA)	40,000	001
	2		Replace Diesel pump exhaust at Lowlift (TSSA)	10,000	002
	3		Install curb containment for diesel fuel (TSSA)	5,000	003
	4		Install curb containment for diesel fuel (TSSA)	5,000	004
	5		Lowlift #3 rebuild / refurbish	17,000	005
	6		WTP Highlift Pump #3 Pump Refurbish	30,000	006
	7		External connection for secondary generator hook-up	15,000	007
	8		Flocculation Tank valves and actuator replacement	95,000	008
	9		Replace fixed screens - algae control	10,000	009
	10		Parkedale Zone 1 PRV Servicing	5,000	010
	11		Parkedale Zone 2 PRV Servicing	5,000	011
	12		Replace Water Tower backup power (UPS)	3,000	012
	13		3rd Party teardown / assessment of UV System	5,000	013
	14		Chlorine analyzer replacements	40,000	014
	15		PLC Programming Software upgrade	40,000	015
	16		SCADA Historian backup drives and offsite storage	25,000	016
				350,000	

PREPARED BY (PROJECT MANAGER): Craig Drake
DATE: 05-Nov-20
REVISED: 28-Jan-21

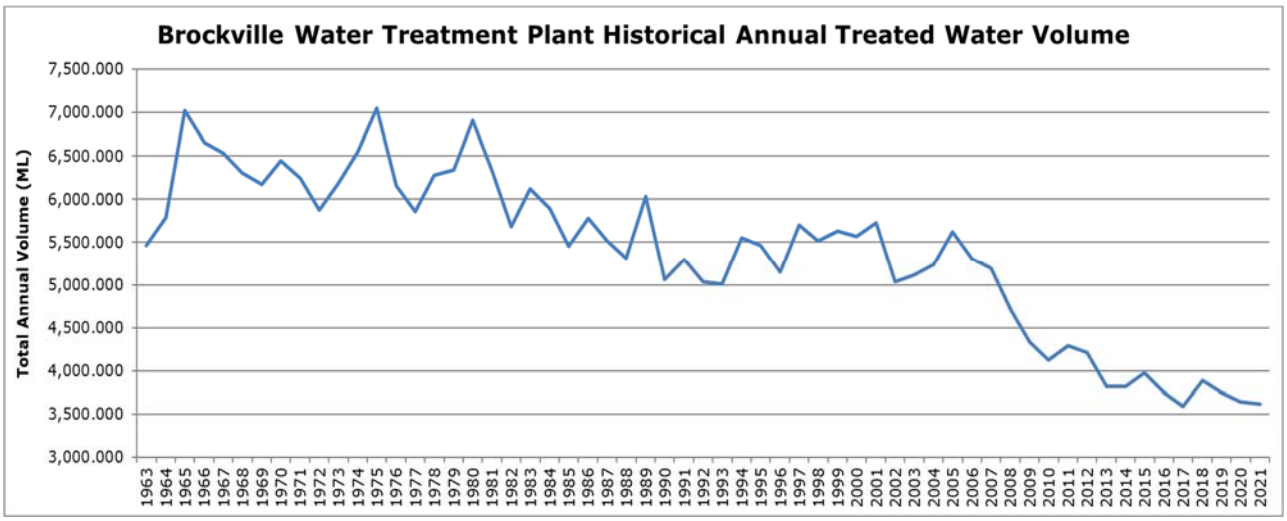
BROCKVILLE WATER SYSTEMS ANNUAL TREATED WATER VOLUME REPORT 2021

Month	WTP Raw Avg Daily Volume (ML)	WTP Raw Max Daily Volume (ML)	WTP Raw Peak Flow (ML/day)	WTP Raw Total Monthly Volume (ML)	WTP Treated Avg Daily Volume (ML)	WTP Treated Max Daily Volume (ML)	Rated Capacity (ML/day)	Rated Flow Capacity (%)	WTP Treated Total Monthly Volume (ML)
January	9.759	10.172	12.481	302.519	9.146	9.617	36.400	27.9%	283.530
February	10.584	12.446	14.369	296.338	9.981	11.919	36.400	34.2%	279.462
March	10.600	10.940	12.483	328.613	9.517	10.388	36.400	30.1%	309.528
April	10.224	11.281	12.913	306.714	9.563	10.640	36.400	31.0%	286.902
May	11.119	12.909	16.427	344.682	10.377	11.989	36.400	35.5%	321.687
June	11.452	12.294	17.120	343.557	10.677	11.668	36.400	33.8%	320.296
July	10.804	11.846	21.990	334.924	10.116	10.904	36.400	32.5%	313.596
August	11.503	13.370	16.567	356.608	10.739	12.517	36.400	36.7%	332.894
September	11.004	12.266	15.630	330.105	10.324	11.691	36.400	33.7%	309.714
October	10.146	11.014	18.015	314.528	9.515	10.340	36.400	30.3%	294.971
November	10.025	10.454	16.968	300.748	9.373	9.823	36.400	28.7%	281.196
December	9.712	10.595	18.058	301.071	9.080	9.981	36.400	29.1%	281.485
TOTAL				3860.407					3615.261

BROCKVILLE WATER SYSTEMS HISTORICAL ANNUAL TREATED WATER VOLUMES

Year	Annual Volume (ML)
1963	5,468.128
1964	5,792.558
1965	7,026.093
1966	6,652.020
1967	6,531.729
1968	6,302.901
1969	6,174.018
1970	6,447.978
1971	6,246.122
1972	5,876.886
1973	6,179.755
1974	6,552.608
1975	7,049.823
1976	6,157.384
1977	5,862.139
1978	6,283.413
1979	6,340.110
1980	6,905.996
1981	6,324.999
1982	5,685.995
1983	6,119.997
1984	5,894.998
1985	5,451.999
1986	5,780.998
1987	5,515.998
1988	5,319.997
1989	6,034.455
1990	5,064.771
1991	5,297.094
1992	5,037.999
1993	5,013.019
1994	5,548.256
1995	5,467.001
1996	5,148.340
1997	5,698.474
1998	5,519.157
1999	5,631.225
2000	5,565.808
2001	5,726.410

Year	Annual Volume (ML)
2002	5,032.500
2003	5,117.740
2004	5,238.190
2005	5,625.869
2006	5,308.800
2007	5,189.831
2008	4,715.116
2009	4,332.102
2010	4,128.747
2011	4,291.115
2012	4,213.592
2013	3,815.746
2014	3,822.724
2015	3,972.362
2016	3,744.720
2017	3,595,184
2018	3,889.242
2019	3,753.200
2020	3,641.936
2021	3,615.261

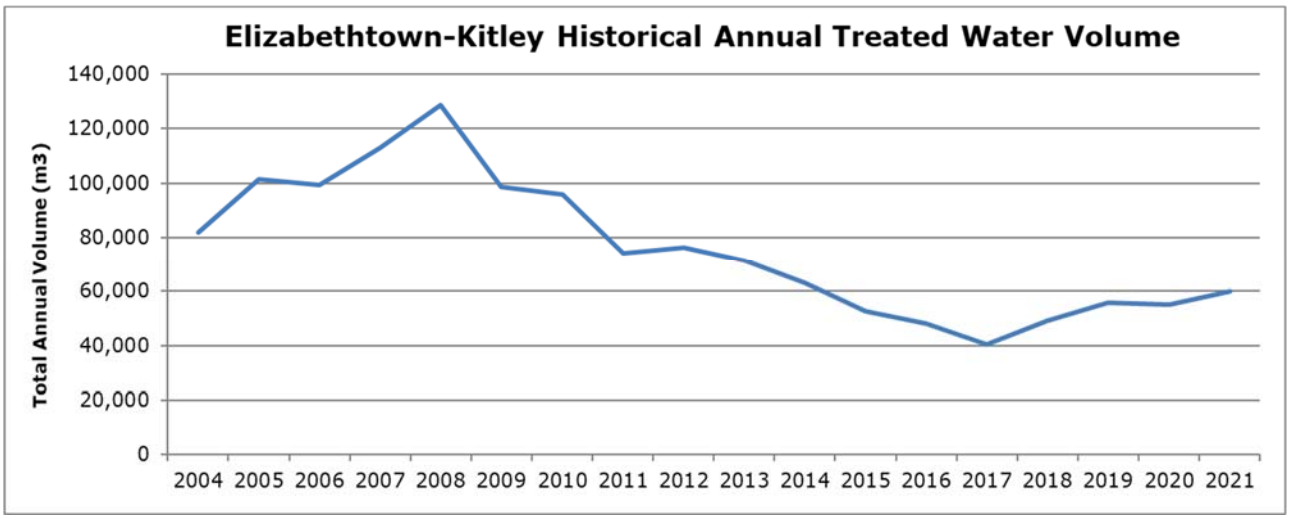


ELIZABETHTOWN-KITLEY WATER DISTRIBUTION ANNUAL TREATED WATER VOLUME REPORT 2021

Month	Avg Daily Volume (m3)	Max Daily Volume (m3)	Max Flow (L/min)	Total Volume (m3)
January	159	515	2,217	4,937
February	129	186	2,834	3,613
March	141	159	1,265	4,368
April	150	246	2,835	4,486
May	181	277	1,126	5,615
June	195	279	1,125	5,855
July	175	222	1,336	5,420
August	176	221	2,465	5,471
September	155	188	1,357	4,655
October	170	219	1,169	5,263
November	135	212	1,031	4,948
December	169	225	1,141	5,245
TOTAL				59,876

ELIZABETHTOWN- KITLEY WATER DISTRIBUTION HISTORICAL ANNUAL TREATED WATER VOLUME

Year	TOTAL VOLUME (m3)
2004	81,913
2005	101,402
2006	99,254
2007	113,068
2008	128,460
2009	98,782
2010	95,876
2011	74,052
2012	76,372
2013	71,552
2014	62,873
2015	52,646
2016	47,965
2017	40,185
2018	49,216
2019	55,753
2020	54,968
2021	59,876


Elizabethtown-Kitley Historical Annual Treated Water Volume
Total Annual Volume (m3)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021

BROCKVILLE
CITY OF THE 1000 ISLANDS

2021 WATER LOSS REPORT

WATER TREATMENT PLANT - DISTRIBUTION TOTAL	***3,615,261 m³***
Water Sold to Customers	
Residential	1,126,355 m^3
Industrial	1,298,301 m^3
Sales to Elizabethtown-Kitley (East of Brockville)	21,408 m^3
Sales to Elizabethtown-Kitley (West of Brockville)	44,461 m^3
TOTAL BILLED WATER	***2,490,525 m³***
Total Non-Revenue Water (NRW)	***1,124,736 m³***
	31.11 %
NRW Sources Accounted For	
Flat Rate Water Users	44,100 m^3
Industrial Fire Flow Testing	5,000 m^3
Chlorinator Flow/Mechanical Seals	18,355 m^3
Watermain Breaks/Service Leaks	325,217 m^3
Anti-Freeze Taps	48,136 m^3
Fire Fighting and Training	6,700 m^3
Hydrant Fire Flow Testing and Flushing	11,856 m^3
Flushing Stations	165,404 m^3
Parks and Recreation Water Use	10,787 m^3
TOTAL	***635,555 m³***
	17.58 %
TOTAL LOST WATER	***489,181 m³***
	13.53 %

Last Reviewed: February 3, 2022
By: C. Drake/S. Allen

2021 WATER LOSS REPORT

TOTAL METERED WATER	***59,876 m³***
TOTAL BILLED WATER (WEST of Brockville)	***44,461 m³***
Total Non-Revenue Water (NRW)	***15,415 m³***
	25.74 %
NRW Sources Accounted For	
Watermain Breaks	7,449 m³
Hydrant Fire Flow Testing	901 m³
Flushing Stations	4,908 m³
TOTAL	***13,258 m³***
	22.1% %
TOTAL LOST WATER	***2,157 m³***
	3.60 %

Last Reviewed: February 3, 2022
By: C. Drake/S. Allen